



A University-National Laboratory-Industry CAT

Overview

The UNI-CAT is a collaboration between scientists from the University of Illinois at Urbana-Champaign, the Oak Ridge National Laboratory, the National Institute of Standards and Technology, and UOP LLC. The UNI-CAT mission is to instrument and operate x-ray research facilities at the Advanced Photon Source (APS) that provide advanced x-ray techniques to a diverse scientific community of UNI-CAT member investigators. This goal is achieved through the development of two sectors at the APS that are designed for cutting-edge x-ray studies in materials, physics, chemistry, biology, and geology. This is a multipurpose scattering facility capable of high-resolution scattering with excellent energy resolution and beam-focusing optics. Special capabilities on the UNI-CAT sectors also include a dedicated surface/interface diffraction station equipped with a molecular-beam epitaxy and chemical-vapor deposition facility (planned), an ultra-small-angle x-ray scattering apparatus, an x-ray microscope (planned), a topography station, a dedicated insertion-device beamline for microfocus and coherent x-ray diffraction, and instrumentation for time-resolved x-ray scattering experiments and reactive environment x-ray absorption spectroscopy.

Research Focus

The primary research areas of UNI-CAT members encompass materials sciences and condensed matter physics, and they include techniques such as structural crystallography, diffuse x-ray scattering, magnetic x-ray scattering, ultra-small-angle x-ray scattering, x-ray microscopy, millivolt resolution spectroscopy, surface and interface scattering, absorption spectroscopy, x-ray topography, microbeam techniques, coherent x-ray diffraction, and time-resolved techniques. These research tools permit UNI-CAT scientists, collaborators, and Independent Investigators to explore fundamental structure/property relationships in bulk solids, at surfaces, and at internal interface boundaries.

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